DOCUMENT RESUME

ED 278 365 IR 012 474

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TITLE Instructional Design Considerations in Converting Non-CBT Materials into CBT Courses.
PUB DATE [86]
NOTE 7p.; Paper presented at the Annual Conference of the National Society for Performance and Instruction (San Francisco, CA, March 31-April 5, 1986).
PUB TYPE Guides - Non-Classroom Use (055) -- Viewpoints (120) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; Computer Graphics; *Courseware; Guidelines; *Instructional Design; Interaction; *Media Adaptation; *Microcomputers; Screens (Displays)
IDENTIFIERS *Printed Materials

ABSTRACT

Instructional designers who are asked to convert existing training materials into computer-based training (CBT) must take special precautions to avoid making the product into a sophisticated page turner. Although conversion may save considerable time on subject research and analysis, courses to be delivered through microcomputers may require additional planning because of hardware and disk space limitations. Problem areas that must be addressed when converting materials for CBT include: (1) continuity of instructional flow, which can be accomplished through a variety of screen techniques; (2) interaction, which will require the creation of additional questions and feedback for varying responses; (3) screen design, which may involve the redesign of printed materials to take advantage of such computer features as color and animation; (4) use of graphics, which can be expensive to develop and take up considerable disk space; (5) hardware limitations which may interfere with design; (6) software limitations that may be imposed by the authoring tools used; (7) learner's limitations, which may involve the adoption of special features to reduce computer-phobia and learner fatigue; and (8) documentation and packaging, including objectives, prerequisites, instructions for use, and the organization of materials on floppy disks. However, each type of material conversion has its own set of problems and solutions, and it may be more practical to start a new design from square one rather than redesign some materials. (DJR)

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INSTRUCTIONAL DESIGN CONSIDERATIONS IN CONVERTING NON-CBT MATERIALS INTO CBT COURSES

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ABSTRACT

At times instructional designers may decide or be asked to convert existing training materials into CBT. Although this approach to CBT development may save considerable time on subject research and analysis, special precautions must be taken to avoid making the product into a sophisticated page-turner. This presentation discusses eight problem areas in transferring traditional training materials into CBT: (1) continuity (2) interaction (3) screen design (4) use of graphics (5) hardware (6) software (7) learner's limitation (8) documentation and packaging.

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At times instructional designers may decide or be asked to convert existing training materials into CBT. Although this approach to CBT development may save considerable time on subject research and analysis, special precautions must be taken to avoid making the product into a sophisticated page-turner. Moreover, courses to be delivered through microcomputers may require additional planning because of hardware and disk space limitations.

This presentation discusses eight problem areas in transferring traditional training materials into CBT:

1. Continuity

Much more can be written on a sheet of paper than on a computer screen. Being able to SEE only a few sentences at a time can disrupt the continuity of thought. Instructional flow may be maintained by:

* expressing a complete idea on each screen display
* appropriate use of a list
* overlays
* partial screen erase
* titles and sub-titles
* footers

2. Interaction

One important advantage of using a computer to deliver a course is the machine's ability to interact with the learner. While other forms of instructional materials also contain questions, they are probably not asked as frequently and responses to these questions are not assessed. Converting materials into CBT requires not only creating more questions but often formulating feedback for every conceivable response. On the other hand, paper-based lesson quizzes, tests, practice items, etc. can often be re-used in a CBT lesson without much modification (except redesigning their display formats at times; see SCREEN DESIGN).

Interaction can be included for many reasons, among them are:

* fact finding, e.g. get learner's name, reading speed, etc.
* learner control, e.g. allow learner to choose alternate routes
* evaluate progress, e.g. test learner for comprehension, etc.

3. Screen Design

An important point to remember about computer screen design is space is free and so are the colors. You do not find such luxury in paper-based materials. For this reason, you may consider re-designing some displays that may otherwise look perfectly acceptable on paper, especially when:

* there is a lot of information on a single display.
* you like to have the graphic displayed side by side with the text
* there is a specific piece of information you would like to focus on on that display

Appropriate use of blank space and colors will not only make a display look more attractive but can focus the learner's attention onto the part of the display you wish to emphasize.

Another important point about computer screen design is one can make images on a screen move, blink, or disappear. A learner can see HOW information is being developed on a screen. In a paper-based lesson, a learner can
only see a finished page. If the development of a display is as important as the display itself, re-design the display so that it can be developed in front of the learner's eyes through the appropriate use of overlays, motion, replacement, etc.

No matter how a screen is developed, the direction of development should be consistent with our natural reading habit. For example, top-down is often used to make a list or a set of procedures, while left-right is used to make comparisons or contrasts.

Unlike most other forms of media, CBT requires the learner to actively participate. Certain parts of the screen should be assigned certain functions not normally required in other media. Examples:

* operation instructions (what to do to proceed, etc.)
* feedback areas
* areas for help or glossary

4. Use of Graphics

Suitable graphics are very effective. However, they can be expensive to develop and can take up considerable disk space. An obvious advantage in converting existing materials to CBT is the convenience of re-using many of the graphics (at least their ideas) without having to design them anew.

There are three major types of graphics: pictures (including photographs of real objects), icons and diagrams.

Pictures generally take up a considerable amount of disk space to store (assuming the CBT resides on floppy disks), and can usually be used only once in a lesson. As there are often other ways to illustrate a point, pictures should only be included if there is a very good reason.

Icons are much cheaper to develop and store. Once developed, they can be re-used to compose a new picture or diagram. The use of icons is both economical and effective.

Diagrams are very easy to develop and generally do not take up much disk space. An effective diagram can be just as illustrative as a picture.

Consider these questions when you have to decide which graphics you will keep or modify:

* Do you have to "entertain" as well as to inform (as is often the case in sales materials)?
* What is the age group and reading level of the intended audience?
* How abstract is the subject matter?
* Do you have the necessary hardware/software available to develop the graphic of your choice economically?
* Do you have the necessary resources (time, skill set)?

Never refer to a graphic that does not appear on the same screen (as is often the case for paper-based materials). Remember, unlike paper-based materials, the learner can only see one screen at a time.

5. Hardware Limitations

A lesson can only be as effective as its delivery station. It pays to know as much as you can about the computers to be used for delivery. Three hardware factors that often interfere with design are: resolution, input/output devices and core memory. You may have to re-adjust the graphic requirement, the amount of information per screen, the way the learner interacts with your lesson, and the amount of information to be processed at one time.

6. Software Limitations

Most CBT lessons are programmed with the help of authoring tools. While these tools can reduce the development time, they impose more restrictions on their products. Depending on the tool, they may impose anything from restricting your screen format to the type of instructional strategy you can use. Before adopting an authoring tool to help you convert your lessons, ask yourself:

* Can you use the tool to develop the required type of instructional strategy efficiently?
* Does it support your graphic requirement? If not, can it support an external graphic package that can do the job?
* Does the use of the tool significantly slow down the access time to certain important parts of your lesson?

If the use of existing authoring tools poses more restrictions on your lesson design than you can tolerate, you may consider developing the tools yourself using a lower level language. The increase in flexibility can often compensate for the extra time required.

7. Learner's Limitations

Computer-phobia and user-fatigue are two recent additions to the growing list of human frailties. To be able to accommodate the limitations of a learner is an important element of design. Converting materials into the new medium requires the adoption of a list of features to reduce the learner's anxiety and increase his control over the course:

* Give clear, concise and unambiguous instruction
* Provide help whenever possible
* Allow learners to undo an entry
* Limit lesson size to 20-30 minutes
* Provide as much learner control as you can
* Be consistent with input procedures

8. Documentation and Packaging

No job is complete until the paper work is done. Clear documentation will reduce anxiety. The parent materials for your conversion may already have some (but probably not all) of these:

* objective(s)
* pre-requisites
* abstract
* instructions on how to get started
* instructions on how to get help

Documentation can be put on-line or off-line. If documentation is to be put on-line, some off-line instructions on how to get started may be necessary.

Packaging is a factor to consider only if the CBT is to be delivered on floppy disks. Depending on the way the converted course is to be used, you may decide to put the course management program, the instructional materials and the test items on separate disks.

Considering all these factors does not guarantee a smooth conversion. At times you may find it more practical to start your design from square one rather than re-design. Each type of instructional material and development environment has its own set of problems and solutions. The same is true for conversion. The best way to start is to take a small segment of material and try it out. Modify your segment until you are satisfied then use it as a prototype. By this time, you should be able to decide if you should design or re-design.